

Unit 1

Use Place Value to Round Whole Numbers

Standard

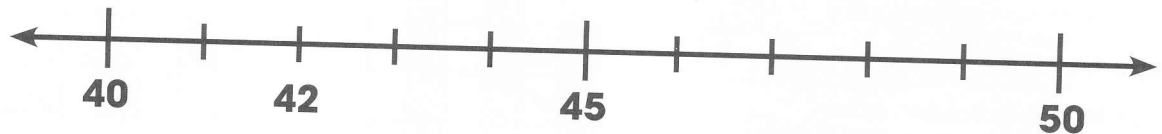
Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.

Model the Skill

Draw the following number line on the board.



- ◆ **Ask:** How can you use a number line to help you round numbers? Look at the number 42. (Locate the number on the line and see which ten it is closer to.) Invite students to circle 42 on the number line and determine which ten it is closer to. (40)
- ◆ **Say:** You can also round numbers to the nearest ten by looking at the ones digits. **Ask:** What digit is in the ones place of 42? (2) How does that help you round 42? (If the digit is less than 5, the tens digit stays the same. If it is 5 or greater, the tens digit increases by one.)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill. Have students round each number to the nearest ten and hundred.

75

145

213

382

161

758

Unit 2

Estimate Sums and Differences

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.1. Use place value understanding to round whole numbers to the nearest 10 or 100.

3.NBT.2. Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Model the Skill

Write the following problem on the board.

$$27 + 42 =$$

- ◆ **Say:** *Today we are going to estimate sums and differences. A sum is the total when you add. A difference is the amount that is left when you subtract. Look at this problem. Will you round the addends to the nearest ten or nearest hundred? Why? (Answer: ten because the addends are much less than 100)*
- ◆ **Ask:** *How can you use rounding to estimate the sum of 27 and 42? (Round 27 to 30 and 42 to 40. Then add 30 and 40 to get 70.) Why might rounding numbers to the nearest ten make it easier to add? (Possible answer: It is easy to add tens.)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill. Have students round each addend to the nearest ten or hundred and then find the sum or difference.

$$\begin{array}{r} 65 \\ + 27 \\ \hline \end{array}$$

$$\begin{array}{r} 85 \\ - 17 \\ \hline \end{array}$$

$$\begin{array}{r} 315 \\ + 178 \\ \hline \end{array}$$

$$\begin{array}{r} 465 \\ - 189 \\ \hline \end{array}$$

$$\begin{array}{r} 841 \\ - 96 \\ \hline \end{array}$$

Unit 3

Add Whole Numbers

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.2. Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Model the Skill

Hand out base-ten blocks and write the following problem on the board.

$$\begin{array}{r} 42 \\ + 29 \\ \hline \end{array}$$

- ◆ **Say:** We are going to add today. We are going to find the sum. A sum is the total amount. How many ones are there in all? (11) Allow students to count or add the ones. Record the ones in the vertical addition.
- ◆ **Ask:** How many tens are there in all? (7) Record the tens. **Ask:** What is the sum of $42 + 29$? (71) Help students connect the models to the standard algorithm by adding the ones first. Accept other ways to find the sum.
- ◆ **Ask:** How did you find the answer? How many ones are there in all? (11) Did you have to regroup the ones? (yes) After you regrouped the ones into ten and one, how many tens are there in all? (7) What is the sum? (71)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\begin{array}{r} 56 \\ + 39 \\ \hline \end{array}$$

$$\begin{array}{r} 227 \\ + 168 \\ \hline \end{array}$$

$$\begin{array}{r} 605 \\ + 128 \\ \hline \end{array}$$

$$\begin{array}{r} 581 \\ + 234 \\ \hline \end{array}$$

Unit 4

Subtract Whole Numbers

Standard

Number & Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.2. Fluently add and subtract within 1,000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Model the Skill

Write the following problems on the board.

$$\begin{array}{r} 57 \\ - 26 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ - 17 \\ \hline \end{array}$$

- ◆ **Say:** We are going to subtract today. We are going to find the difference. Look at the first problem on the board. How many ones are there in the number 57? (7) How many ones are you going to take away? (6) Allow students to record the difference.
- ◆ **Ask:** How many tens are there in 57? (5) How many tens are you going to take away? (2) Allow students to record the remaining tens. (3) **Ask:** What is the difference of $57 - 26$? (31)
- ◆ **Say:** Look at the next problem. What happens when you subtract the ones? Students should recognize that there are not enough ones to subtract and therefore they must regroup. Discuss how to regroup and record the regrouped ten. **Ask:** How many ones and tens are left after subtracting? (8 ones, 4 tens) What is the difference? (48)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\begin{array}{r} 48 \\ - 29 \\ \hline \end{array}$$

$$\begin{array}{r} 185 \\ - 118 \\ \hline \end{array}$$

$$\begin{array}{r} 307 \\ - 126 \\ \hline \end{array}$$

$$\begin{array}{r} 465 \\ - 346 \\ \hline \end{array}$$

Unit 5

Solve Two-Step Word Problems

Standard

Operations & Algebraic Thinking

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

3.OA.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

Model the Skill

Hand out counters and write the following problem on the board.

Sam has 3 apples and some bananas.
He has 8 pieces of fruit in all.
How many bananas does Sam have?

$$3 + b = 8$$

- ◆ **Say:** *Today we are going to solve problems that use a letter to stand for an unknown quantity. Look at this word problem. What do we know? (Sam has 3 apples and some bananas. He has 8 pieces of fruit in all.) What do we need to find out? (how many bananas Sam has) What letter should we use to represent the number of bananas? (b) Point out that any letter can be used to represent an unknown quantity.*
- ◆ Using red counters, model the apples. Ask a volunteer to add yellow counters to make a total of 8. **Ask:** *How many apples are there? (3) How many bananas did we add to make 8 pieces of fruit in all? (5) How many counters are there in all? (8)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

Lila has 6 strawberries. She eats 1. Then she gives 3 away. How many strawberries does she have left?

The orchard had 8 rows of apple trees. There were 7 trees in each row. 2 trees were cut down after they were damaged in a storm. How many trees are remaining in the orchard?

Unit 6

Meaning of Multiplication

Standard

Operations & Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.1. Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7 .

Model the Skill

Hand out counters.

- ◆ **Say:** *We are going to see how addition and multiplication are related. Have students use counters to model 4 groups of 3.*
- ◆ **Ask:** *How many equal groups do you have? (4) How many counters are there in each group? (3) How many counters are there in all? (12)*
- ◆ **Say:** *You can record 4 groups of 3 as an addition sentence or as a multiplication sentence. Have students record the sum and the product.*
Ask: *What is the sum of $3 + 3 + 3 + 3$? (12) What is the product of 4×3 ? (12) Remember, to multiply you need equal groups.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$4 + 4 + 4 = \underline{\hspace{2cm}}$$

$$3 \times 4 = \underline{\hspace{2cm}}$$

$$6 + 6 = \underline{\hspace{2cm}}$$

$$2 \times 6 = \underline{\hspace{2cm}}$$

Unit 7

Properties of Multiplication

Standard

Operations & Algebraic Thinking

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.5. Apply properties of operations as strategies to multiply and divide (i.e.: commutative property of multiplication, associative property of multiplication, and distributive property).

Model the Skill

Hand out counters.

- ◆ Have students use counters to model the commutative property of multiplication. **Say:** *Today we are going to multiply two numbers and then change the order of the numbers to see if the product will change.* Have students model along as you demonstrate how to show 3×2 with counters.
- ◆ **Ask:** *How many groups of counters are there? How many counters are in each group? What is the product of 3×2 ?*
- ◆ **Say:** *Now let's see what happens to the product when we change the order of the numbers.* Guide students to model 2×3 . **Ask:** *How many groups of counters are there? How many counters are there in each group? What is the product of 2×3 ? Does changing the order of the numbers change the product? (no) If you know $3 \times 2 = 6$, then you know $2 \times 3 = 6$.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$3 \times 4 = \underline{\hspace{2cm}}$

$2 \times (2 \times 3) = \underline{\hspace{2cm}}$

$4 \times 6 = \underline{\hspace{2cm}}$

$(2 \times 2) \times 3 = \underline{\hspace{2cm}}$

$5 \times 7 = \underline{\hspace{2cm}}$

$4 \times (2 \times 2) = \underline{\hspace{2cm}}$

$8 \times 8 = \underline{\hspace{2cm}}$

$(4 \times 2) \times 2 = \underline{\hspace{2cm}}$

Unit 8

Patterns in Multiplication

Standard

Operations & Algebraic Thinking

Explain patterns in arithmetic.

3.OA.9. Identify arithmetic patterns, and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.

Model the Skill

Hand out counters and write the following problem on the board.

$$1 \times 3 = 3$$

- ◆ Have students use counters to model the problem. **Say:** *Today we are going to look for patterns when we multiply.* Have students model along as you demonstrate how to show 1×3 with counters.
- ◆ **Ask:** *How many groups of counters are there? How many counters are there in the group? What is the product of 1×3 ?*
- ◆ **Say:** *Now let's try multiplying other numbers by 1. What pattern do you see when we multiply with 1?* (Possible response: The product is always the other factor.)
- ◆ Follow a similar process for multiplying by zero. **Ask:** *Why don't you need counters to model 0×3 ?* (Possible response: because there are 0 groups of 3, which means you don't need any counters)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

Write the following patterns on the board and ask students to complete each pattern and then define the rule for each pattern.

2, 4, 6, __, __, 12, __, 16 __, 20

3, 6, __, __, 15, __, 21 __, 27, __, 33, __

16, 20, __, 28, __, __, 40, 44

12, 18, __, 30, __, 42, __, __

Unit 9

Multiply by Multiples of Ten

Standard

Number and Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 using strategies based on place value and properties of operations.

Model the Skill

Hand out ten-roads and write the following problems on the board.

$$1 \times 10 = 10$$

$$1 \times 20 = 20$$

$$2 \times 10 = 20$$

$$2 \times 20 = 40$$

- ◆ Have students use counters to model the first problem. **Say:** *Today we are going to look for patterns when we multiply by multiples of ten. Demonstrate how to show 1×10 with base-ten blocks.*
- ◆ **Ask:** *How many groups of tens are there? How many counters are there in the group? What is the product of 1×10 ?*
- ◆ **Say:** *Now let's try multiplying numbers by 20. What pattern do you see when we multiply with 20?* (Possible response: The product is the same as the fact in the tens place with a zero in the ones place.)
- ◆ Follow a similar process for multiplying 2×10 and 2×20 .
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$1 \times 20$$

$$2 \times 20$$

$$3 \times 20$$

$$4 \times 20$$

$$5 \times 20$$

$$6 \times 20$$

Unit 10

Meaning of Division

Standard

Operations & Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.2. Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.5. Apply properties of operations as strategies to multiply and divide.

3.OA.6. Understand division as an unknown-factor problem.

Model the Skill

Hand out counters and write the following number sentences on the board.

$$2 + 2 + 2 = 6$$

$$3 \times 2 = 6$$

- ◆ Discuss how addition and multiplication are related. **Say:** *Today we will see how subtraction and division are related.* Have students use counters to model 3 groups of 2 and model each number sentence. Then have students use counters to model repeated subtraction.

$$6 - 2 - 2 - 2 = 0$$

$$6 \div 2 = 3$$

- ◆ **Ask:** *How many counters did you start with? (6) What number did you subtract each time? (2) How many times did you subtract 2? You subtracted 2 until you got an answer of 0. You subtracted 2 three times. You can say that there are 3 groups of 2 in 6.*
- ◆ Remind students that the answer to a division problem is called the quotient. Help students connect the repeated subtraction to the division sentence.
Ask: *What is the quotient of $6 \div 2$? (3)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$12 - 4 - 4 - 4 = \underline{\hspace{2cm}}$$

$$12 \div 4 = \underline{\hspace{2cm}}$$

$$12 - 6 - 6 = \underline{\hspace{2cm}}$$

$$12 \div 6 = \underline{\hspace{2cm}}$$

Unit 11

Fact Families for Multiplication and Division

Standard

Operations & Algebraic Thinking

Multiply and divide within 100.

3.OA.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Model the Skill

Hand out counters and write the following problems on the board.

$$3 \times 4 = 12$$

$$12 \div 3 = 4$$

- ◆ **Say:** Multiplication and division are opposite operations. That means they undo each other. Demonstrate how to use counters to model 3 groups of 4.
Ask: How many groups of counters are there? (3) How many counters are in each group? (4) How many counters are there in all? (12)
- ◆ Then demonstrate how to separate 12 counters into 3 equal groups. **Ask:** How many counters did I start with? (12) How many groups did I make? (3) How many counters are there in each group? (4) **Say:** 12 divided into 3 groups is 4 in each group. Remind students that the answer to a division problem is called the quotient. Demonstrate how to record the quotient.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill. Ask students to complete the following fact families.

$$5 \times 6 = 30$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$4 \times 9 = 36$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

Unit 12

Solve Multiplication and Division Problems

Standard

Operations & Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

Model the Skill

Hand out counters and write the following problem on the board.

There are 3 flowers in each vase. There are 5 vases. How many flowers are there?

- ◆ **Say:** *Today we are going to solve different types of word problems. Look at the problem. How many flowers are there in each vase? (3) How many vases are there? (5) There are 5 groups of 3 flowers. How can we find how many flowers there are in all? Have students share different strategies for finding the total number of flowers. (15; Possible responses: count the flowers; find the total of 5 groups of 3)*
- ◆ Use counters to demonstrate how to use repeated addition or multiplication to solve the problem. **Say:** *You can use repeated addition or multiplication to find the total number of flowers. The sum and the product will be the same.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$5 \times 6 = 30$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \div \underline{\quad} = \underline{\quad}$$

$$4 \times 9 = 36$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

Unit 13

Use Multiplication or Division to Find the Missing Number

Standard

Operations & Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.6. Understand division as an unknown-factor problem.

Model the Skill

Hand out counters and write the following problem on the board.

$$4 \times 6 = \underline{\hspace{2cm}}$$

- ◆ **Say:** *Today we are going to model multiplication problems to find the missing product or factor.* Remind students that the factors are the numbers that are multiplied, and the product is the answer to the multiplication problem.
- ◆ Have students look at the problem above. **Ask:** *Is the product or a factor missing?* (product) *How do you know?* (Possible answer: The missing number is by itself after the equal sign.) *What are the factors?* (4 and 6) *How can you model the problem?* (Possible response: Show 4 groups of 6 counters.) Have students model, record, and share their work. **Ask:** *What is the product?* (24)

$$4 \times \underline{\hspace{2cm}} = 24$$

- ◆ Write the above follow-up problem on the board, and have students look at it. **Ask:** *Is the product or a factor missing?* (factor) *How do you know?* (Possible answer: The missing number comes right after the multiplication sign.) Have students model the problem with counters, then draw to record their work.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Have them share their strategies for finding the missing numbers in the problems.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$4 \times 6 = \underline{\hspace{2cm}}$$

$$32 \div \underline{\hspace{2cm}} = 8$$

$$25 \div \underline{\hspace{2cm}} = 5$$

$$\underline{\hspace{2cm}} \div 7 = 3$$

Unit 14

Understand Fractions

Standard

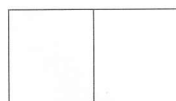
Number & Operations—Fractions

Develop understanding of fractions as numbers.

3.NF.1. Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.

Model the Skill

Draw the following figure on the board.

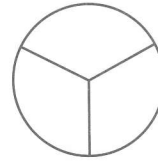
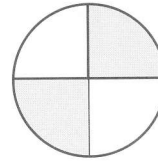
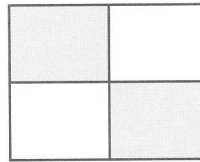
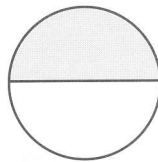
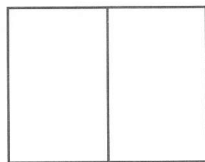
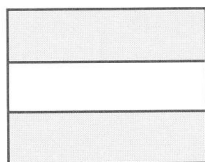


- ◆ **Say:** Today we are going to learn about fractions. A fraction names part of a whole or part of a group. Look at this rectangle. How many equal parts is the rectangle divided into? (2) Each part is one-half of the whole rectangle.
- ◆ Write the fraction $\frac{1}{2}$ on the board. Have students look at the fraction $\frac{1}{2}$ and point to the numerator. **Say:** The numerator is the top number of a fraction. The numerator names a part of the whole. Have students point to the denominator. **Say:** The denominator is the bottom number of a fraction. The denominator tells how many equal parts are in the whole.
- ◆ Model writing the fraction for the rectangle again. **Ask:** How many equal parts are in the whole rectangle? (2) What fraction names each equal share or part? ($\frac{1}{2}$) Have students practice writing the fraction for similar shapes sectioned in halves, thirds, and fourths or quarters.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill and share their strategies for finding the missing numbers in each fraction. They should recognize that the denominator is always the same as the number of equal parts. Have them identify whether the numerator or the denominator is the missing number.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Ask:** How many equal parts are in the whole? How many equal parts are shaded? What fraction shows the shaded part?



Unit 15

Fractions on a Number Line

Standard

Number & Operations—Fractions

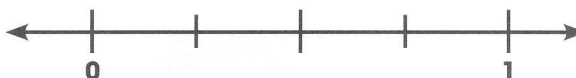
Develop understanding of fractions as numbers.

3.NF.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.

- Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.
- Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Model the Skill

Draw the following number line.



- ◆ **Say:** You can use a number line to show fractions. Look at this number line. How does the number line show equal parts? (Possible response: The tick marks are spaced equally.) How many equal spaces are there? Help students count each equal part of the number line to verify that there are 4 equal parts.
- ◆ Point out the 0 and 1 under the first and last tick marks. **Say:** The number line shows one whole. Each space is one equal part of the number line. Since this number line is divided into 4 equal spaces, we can say that it shows fourths, or quarters.
- ◆ Add tick marks to show eighths. **Ask:** Now how many equal parts does this number line have? Which word tells how this number line is divided? (eighths)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ Have students label the number line with the following points:

$\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$



Unit 16

Equivalent Fractions

Standard

Number & Operations—Fractions

Develop understanding of fractions as numbers.

- 3.NF.3.** Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
- a) Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
 - b) Recognize and generate simple equivalent fractions, e.g., $\frac{1}{2} = \frac{2}{4}$, $\frac{4}{6} = \frac{2}{3}$. Explain why the fractions are equivalent, e.g., by using a visual fraction model.
 - c) Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers.

Model the Skill

Hand out fraction bars and draw the following model on the board.

1							
$\frac{1}{2}$				$\frac{1}{2}$			
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

- ◆ **Say:** Today we are going to learn about equivalent fractions. Equivalent fractions are fractions that are equal—they name the same amount. Have students use fraction bars to model one-half. **Say:** We want to see how many fourths it takes to equal one-half. Have students use fraction bars to model the fourths.
- ◆ **Ask:** How many fourths are equal to one-half? How do you know? (2. It takes two-fourths to be the same size as one-half.) **Say:** One-half and two-fourths are the same size. One-half and two-fourths are equivalent fractions. You might suggest that students place the fourths on top of the half as another way to show they are equal.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\frac{1}{2} = \frac{\square}{4}$$

$$\frac{1}{2} = \frac{\square}{6}$$

$$\frac{1}{2} = \frac{\square}{8}$$

$$\frac{1}{2} = \frac{\square}{10}$$

$$\frac{3}{6} = \frac{\square}{2}$$

$$\frac{3}{4} = \frac{\square}{8}$$

$$\frac{1}{4} = \frac{\square}{8}$$

$$\frac{2}{4} = \frac{\square}{2}$$

Unit 17

Compare Fractions

Standard

Number & Operations—Fractions

Develop understanding of fractions as numbers.

3.NF.3. d) Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.

Model the Skill

Hand out fraction bars.

- ◆ Remind students how they can use symbols to compare whole numbers. Review the meaning of the symbols $<$, $>$, and $=$. **Say:** *Today we are going to use symbols to compare fractions.* Have students use fraction bars to model the problem. **Say:** *When the denominators are the same, the fraction with the greater numerator is the greater fraction.* **Ask:** *Which is greater, $\frac{1}{3}$ or $\frac{2}{3}$? ($\frac{2}{3}$) How do you know?* (Possible response: When you look at the models, $\frac{2}{3}$ is larger than $\frac{1}{3}$.) **Say:** *$\frac{2}{3}$ is greater than $\frac{1}{3}$. Another way to say this is $\frac{1}{3}$ is less than $\frac{2}{3}$. What symbol will you write in the circle? ("is less than" symbol) $\frac{1}{3}$ is less than $\frac{2}{3}$.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Point out that when fractions in a pair have the same numerator and denominator, they are equal. **Say:** *$\frac{3}{8}$ is equal to $\frac{3}{8}$. Is $\frac{3}{3} = \frac{6}{6}$? Discuss why.*

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

$$\frac{2}{8} \bigcirc \frac{5}{8}$$

$$\frac{1}{8} \bigcirc \frac{1}{2}$$

$$\frac{3}{6} < \frac{\square}{6}$$

$$\frac{2}{4} \bigcirc \frac{1}{3}$$

$$\frac{4}{4} \bigcirc \frac{3}{3}$$

$$\frac{3}{4} > \frac{\square}{4}$$

Unit 18

Time to the Minute

Standard

Measurement & Data

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

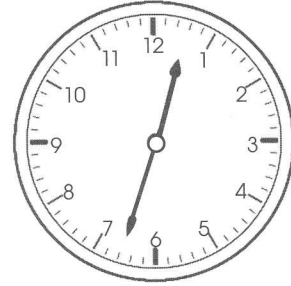
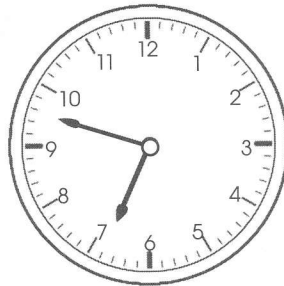
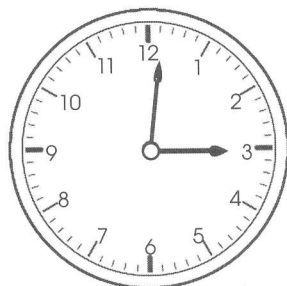
3.MD.1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

Model the Skill

- ◆ Display a demonstration analog clock. Review the parts of the clock. Have students identify the hour hand, the minute hand, and the numbers on the clock face.
- ◆ **Ask:** *How can we use a clock to tell time?* (Possible response: look at the numbers that the hour hand and minute hand point to) **Say:** *The hour hand tells what hour it is. The minute hand tells how many minutes before or after the hour it is. There are 60 minutes in an hour. Each mark on the clock shows one minute. The marks on the clock can help us tell time to the minute.*
- ◆ Draw a clock that shows 10:15. **Ask:** *What number does the hour hand point to? (10) What number does the minute hand point to? (15) What time does the clock show? (10:15)* Demonstrate how to record the time. Remind students that the colon separates the hours from the minutes.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.



Unit 19

Grams, Kilograms, Liters

Standard

Measurement & Data

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.

3.MD.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

Model the Skill

Hand out identical objects, such as pencils or nickel coins to each student.

- ◆ **Say:** *Today we are going to learn about mass. The mass of an object tells the amount of matter in that object. On Earth, it also tells us how heavy an object is. You can measure mass in grams or kilograms. One kilogram is equal in mass to 1,000 grams. Display a balance and some gram weights.*
Say: *I could use grams and a balance to measure the mass of a crayon or an eraser. What other objects might I measure this way? (Possible response: small, light objects such as paper or a pen) Allow students to brainstorm other objects that might be measured using grams and a balance, and other objects that might be measured using kilograms and a scale.*
- ◆ Have students work together to estimate and then measure their nickels. To help students estimate, have them hold the weights and the object they will measure. Remind students that an estimate is a thoughtful guess.
- ◆ **Ask:** *Would it be better to use grams or kilograms to measure the mass of a cat? Why? (Possible response: kilograms because grams are too small a unit of measurement) Have students suggest other items that might be measured better in grams or kilograms.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** *Estimate and then find the mass of the following objects:*
 - a ruler
 - a pen
 - a shoe
 - a full bookbag or backpack

Unit 20

Measure Length to the Nearest Quarter Inch

Standard

Measurement & Data

Represent and interpret data.

3.MD.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Model the Skill

Hand out rulers and unsharpened pencils.

- ◆ **Say:** *You can use an inch ruler to measure the length of an object. Have students look at the ruler. Help them identify the $\frac{1}{4}$ -inch and $\frac{1}{2}$ -inch marks on the ruler. Point out that the $\frac{1}{2}$ -inch mark is the same as $\frac{2}{4}$. Have students identify specific points on the ruler, such as $1\frac{1}{2}$ inches, $2\frac{1}{4}$ inches, and $4\frac{3}{4}$ inches.*
- ◆ **Ask:** *What is the length of the unsharpened pencil to the nearest half inch? ($7\frac{1}{2}$ inches) How did you find your answer? (Possible response: I looked for the number on the ruler that is closest to the end of the pencil.) We can say the length of the ruler is $7\frac{1}{2}$ inches to the nearest half inch.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** *Estimate and then find the length of the following objects:*
 - a book
 - a desk
 - a tissue box
 - a calculator

Unit 21

Make and Use Pictographs

Standard

Measurement & Data

Represent and interpret data.

3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

Model the Skill

Draw the following pictograph on the board.



Each  stands for 2 votes.

- ◆ **Say:** Today we are going to learn about pictographs. Pictographs are graphs that use pictures or symbols to show information or data. What is the title of the graph? (Favorite Juices) What are the juice choices? (apple, grape, and orange) What does each cup stand for? (2 votes) How do you know? (Possible response: The key under the graph tells you.)
- ◆ **Ask:** Which juice got the most votes? How do you know? (grape; possible explanation: it has the most cups/votes) Have students share their strategies.
- ◆ **Ask:** How many students voted for orange juice? (3) How can you tell by looking at the graph? (Possible response: I see there is a half cup, which would mean half of 2, which is 1.)
- ◆ **Ask:** How many more students voted for grape juice than apple juice? (2) Have students discuss other strategies such as subtracting the number of votes for apple juice from the number of votes for grape juice.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problem to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** Interview your classmates. Ask them to vote on their favorite sandwich or favorite fruit. Then share the data in a pictograph.

Unit 22

Make and Use Bar Graphs

Standard

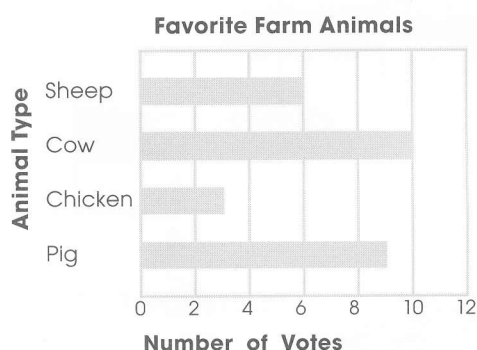
Measurement & Data

Represent and interpret data.

3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

Model the Skill

Copy the following bar graph onto the board.



- ◆ **Say:** *Today we are going to learn about bar graphs. Bar graphs are graphs that use bars to show information or data. What is the title of this graph? (Favorite Farm Animals) What are the animal types? (sheep, cow, chicken, pig) What does each axis show? (The x axis, or horizontal axis, shows the number of votes and the y-axis, or the vertical axis, shows the type of animal.) How do you know? (Possible response: because each axis is labeled)*
- ◆ **Ask:** *Which animal got the most votes? How do you know? (cow; possible explanation: that bar is the longest) Have students share their strategies.*
- ◆ **Ask:** *How many more students voted for pig than chicken? (6) How can you tell by looking at the graph? Have students discuss other strategies such as subtracting the number of votes for chicken from the number of votes for pig.*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following activity to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** *Interview your classmates. Ask them to vote on their favorite type of pet or favorite sandwich. Then share the data in a bar graph.*

Unit 23

Understand Perimeter

Standard

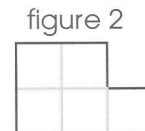
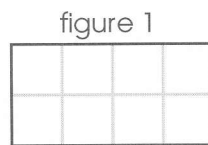
Measurement & Data

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

3.MD.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Model the Skill

Draw the following figures on the board.



- ◆ **Say:** Today we are going to learn about perimeter. Perimeter is the distance around a figure. Have students look at figure 1. Demonstrate how to find the length of each side.
- ◆ **Ask:** What shape is this figure? (rectangle) What is the perimeter? How do you know? (12 units; possible explanation: there are 12 units around the rectangle, so the perimeter is 12; add the length of each side)
- ◆ Have students look at figure 2. **Ask:** How is this figure different from figure 1? (Possible response: This is not a rectangle; this figure looks like a square with an extra square unit.) Point out that students can still tell the perimeter of the figure by counting the number of units. Help students find the length of each side.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** Find the perimeter of a book, your desk, a piece of paper. Draw a closed shape with a perimeter of 18 inches.

Unit 24

Understand Area

Standard

Measurement & Data

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

3.MD.5. Recognize area as an attribute of plane figures and understand concepts of area measurement.

3.MD.6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

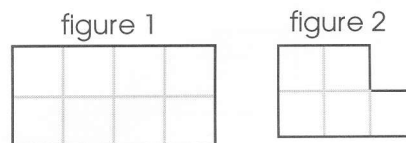
3.MD.7. Relate area to the operations of multiplication and addition.

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

3.MD.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Model the Skill

Draw the following figures on the board.



- ◆ **Say:** *Today we are going to learn about area. Area is the number of square units that are needed to cover a flat surface.* Have students look at figure 1 and identify one square unit. **Ask:** *What figure do the square units make? (rectangle) You can count the square units in the rectangle to find its area. How many square units are in the rectangle? (8) We can say that the area of this rectangle is 8 square units.*
- ◆ Have students look at figure 2. **Ask:** *How is this figure different from figure 1? (Possible response: This is not a rectangle; this figure has more sides, fewer square units.)* Point out that students can still tell the area of the figure by counting the number of square units. (5) Allow students to use square tiles if they wish to model the figure, and then find the area.
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** *Find the area of a tabletop, desktop, or a piece of paper. Draw a closed shape with an area of 18 inches.*

Unit 25

Find Area

Standard

Measurement & Data

Geometric measurement: understand concepts of area and relate area to multiplication and to addition.

3.MD.5. Recognize area as an attribute of plane figures and understand concepts of area measurement.

3.MD.6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

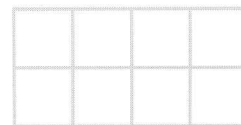
3.MD.7. Relate area to the operations of multiplication and addition.

Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

3.MD.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

Model the Skill

Draw the following rectangle on the board.



- ◆ **Say:** Today we are going to learn about the different ways to find area. Area is the number of square units that are needed to cover a flat surface. Have students look at the rectangle and identify one square unit. **Ask:** How can you find the area of this rectangle? (count square units, add rows or columns) You can also multiply the number of rows by the number of columns to find the area of a rectangle. You can multiply the length by the width.

$$A = l \times w$$

- ◆ Help students count the length and width of the rectangle in units and then use the formula to find the area. **Ask:** What is the area of the rectangle? (8 square units)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. Allow students to use square tiles if they wish to model the figure, and then find the area.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Say:** Find the area of a book, your desk, a piece of paper. Then draw a closed shape with an area of 16 square inches.

Unit 26

Quadrilaterals

Standard

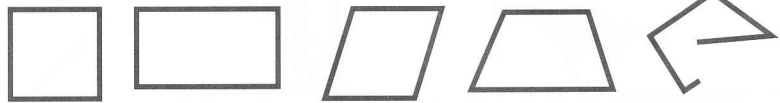
Geometry

Reason with shapes and their attributes.

3.G.1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

Model the Skill

Draw the following.



- ◆ **Say:** We are going to learn about quadrilaterals today. A quadrilateral is a plane figure with four sides. A plane figure is a closed figure—it begins and ends at the same place. Have students identify the open and closed figures.
- ◆ **Ask:** What shape is figure 1? (square) How do you know the figure is a square? (Possible response: It has four sides and four right angles.) Is a square a quadrilateral? How do you know? (Yes. It is a plane figure with four sides.)
- ◆ Have students look at the fifth figure. **Ask:** What shape is this figure? (open figure) How many sides does this figure have? Is this figure a quadrilateral? Why or why not? (No. It has 5 sides and it is not a closed figure.)
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

Have students draw a:

- square
- rectangle
- rhombus
- trapezoid

Unit 27

Partition Shapes

Standard

Geometry

Reason with shapes and their attributes.

3.G.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape.

Model the Skill

- ◆ Hand out sheets of paper to each student.
- ◆ **Ask:** *What type of shape is this piece of paper? (rectangle/quadrilateral) Draw a line on this piece of paper so that the paper shows two equal shares. Each share of the paper is the same size. The shares are equal. How is this paper divided? (into halves) Each half of the rectangle is one-half.*
- ◆ **Say:** *Now draw another line on this piece of paper so that the paper shows four equal shares. What does the paper show now? (fourths or quarters)*
- ◆ Assign students the appropriate practice page(s) to support their understanding of the skill. If necessary, have students fold another sheet of paper to see the equal shares for halves, fourths, and thirds.

Assess the Skill

Use the following problems to pre-/post-assess students' understanding of the skill.

- ◆ **Ask:** *How would you partition each of these shapes into:*

- halves
- thirds
- fourths, or quarters

